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ABSTRACT

In response to the New York State Board of Regents Action Plan relating to computer keyboarding skills, this guide is designed to help elementary school staff understand aspects of keyboarding and develop this important basic skill in their students. The three-part presentation begins with a discussion of the benefits of using computers in English language arts, differences between keyboarding and typewriting, outcomes of keyboard instruction, and general guidelines for achieving those outcomes. The second section addresses issues pertinent to planning for keyboarding instruction, including planning considerations, research on students and keyboarding, planning for teacher awareness and training, instruction, reviewing instructional equipment and materials, and evaluation. The final section, focusing on implementing keyboarding instruction, discusses (1) choosing an approach, (2) suggested instructional sequence for one lesson, (3) ideas for preparing lessons, (4) suggestions for enhancing instruction, (5) initial keyboarding, (6) procedures for initial introduction to keyboarding, (7) presenting the numeric keyboard, (8) suggested skill development activities, (9) some language arts development strategies, and (10) activities for releasing tension. Five appendixes provide a glossary, suggested readings, a conventional keyboard chart, a discussion of issues regarding handicapped students, and a sampling of software. (JD)

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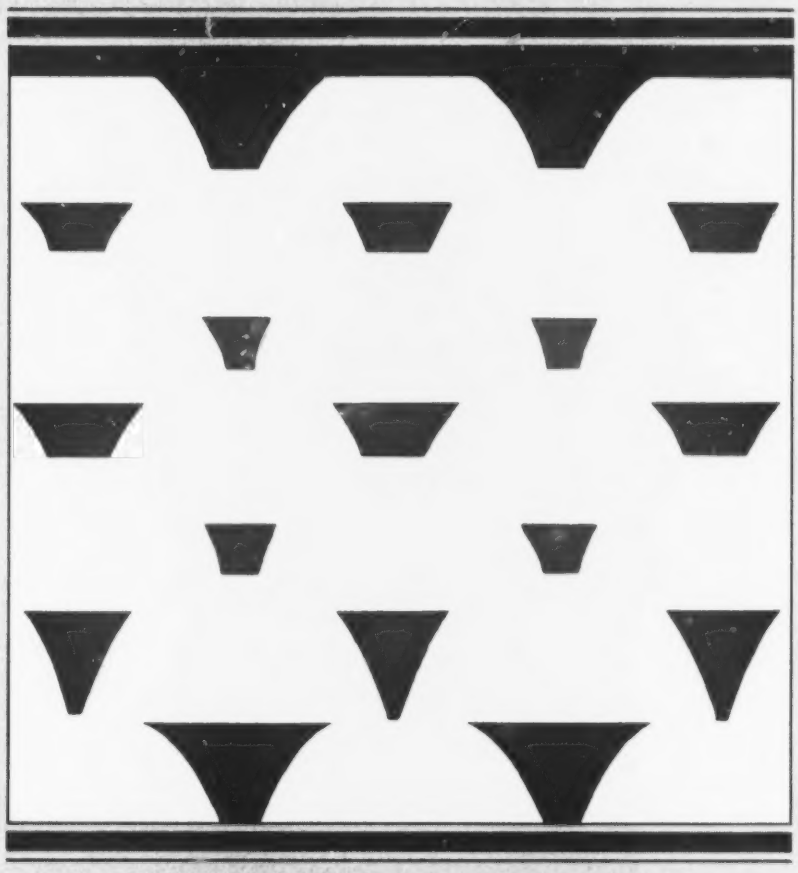
DEVELOPING

KEYBOARDING SKILLS

TO SUPPORT THE ELEMENTARY LANGUAGE ARTS PROGRAM



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THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department

June 1986

TO: Persons With Responsibility for Implementing Keyboarding Instruction Within the Elementary Language Arts Program

FROM: Edward T. Lalor, Director, Division for Program Development
Jane Algozzine, Director, Division of Language Skills
Willard R. Daggett, Director, Division of Occupational Education Programs

The publication, Developing Keyboarding Skills to Support the Elementary Language Arts Program, has been developed to address the Regents Action Plan recommendation that instruction in keyboarding skills be included in the elementary language arts program. It has been sent to district superintendents, superintendents and principals of public and nonpublic schools, public elementary school teachers, business education department chairpersons and directors or coordinators of instructional technology.

Developing Keyboarding Skills to Support the Elementary Language Arts Program is intended to provide elementary school staff with information to help students become familiar with fundamental keyboarding techniques and keyboarding functions. The integration of keyboarding skills within the elementary language arts program will provide students with the skills they will need to effectively use keyboards for recording ideas, creating drafts, and organizing and analyzing data.

This publication may be duplicated for use by instructional staff.

Please forward comments about this publication to:

Carol Anne Stiglmeier
Bureau of Curriculum Development
New York State Education Department
Washington Avenue, Room 314-B Education Building
Albany, New York 12234

For Review and Comment

DEVELOPING KEYBOARDING SKILLS

TO SUPPORT THE

ELEMENTARY LANGUAGE ARTS PROGRAM

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FOREWORD

Technology has made a strong impact on every aspect of our society. The education of our youth must respond to the needs they will have to use technology in their education and in their careers. Electronic keyboards and computers are being used more and more by students in all subject areas and grade levels to access and manipulate data, compose written material, and to simulate situations. Fostering the ability to use electronic keyboards and computers has been deemed an important component of the elementary language arts program by the Board of Regents and has been included in the Regents Action Plan to Improve Elementary and Secondary Education Results in New York State.

Developing Keyboarding Skills to Support the Elementary Language Arts Program is a guide intended to assist elementary school staff in meeting the requirement of the Regents Action Plan relating to keyboarding skills. The evolution of this publication occurred over a two year period and reflects the contributions of many elementary school administrators and teachers and occupational education teachers. After review, the Department will look at needs for further revision.

DEVELOPING KEYBOARDING SKILLS TO SUPPORT THE ELEMENTARY LANGUAGE ARTS PROGRAM

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I. INTRODUCTION

The New York State Board of Regents Action Plan to Improve Elementary and Secondary Education Results in New York includes the following statement: "Instruction in keyboarding will be included in the State-developed English Language Arts Syllabus."

With the advent of computers as tools in the home, classroom, and workplace, the ability to properly keyboard has become an important basic skill. Students are increasingly being offered opportunities to use computers, and schools must ensure that these opportunities are available for all students on an equal basis. Computers can enhance educational experiences and help with communication for students with handicapping conditions. Students need to become familiar with fundamental keyboarding techniques and keyboarding functions in order to record, retrieve, and manipulate data, and to use the keyboard for communication. While this is an important skill for students to develop, it can best be developed within the context of the instructional program.

A. The Benefits of Using Computers in English Language Arts

There are several reasons why computers and word processors are appropriate tools for teaching the English language arts:

- The teaching of English emphasizes process--the process of composing, the process of comprehending, the process of responding to literature, the process of critical thinking. The power of the computer to manipulate symbols, words, sentences or data easily, by students of all ages, makes the computer a natural vehicle for facilitating and strengthening the processes of the mind.

- Language learning is active, engaged and personal. Software programs which encourage peer interaction and promote language play come close to Seymour Papert's vision of a computer as "a mudpie," performing uncritically and flexibly as students explore and manipulate the patterns and functions of language.

- The writing process is, by its very nature, formless and cumbersome. The capacity of the computer to store large quantities of text; to allow the user to insert, delete, and rearrange material; and to match the text against spelling checks or style analyzers, enables students to discover what they have to say, bring shape to their writing, and perform the final polishing with a minimum of fuss.

- English is a multi-faceted discipline which demands much of its teachers: managing large numbers of students with widely divergent needs and abilities, reading and responding to quantities of (often illegible) papers, doing justice to all five strands of the language arts and capitalizing on the connections between them. Used appropriately, computers can save time, provide periodic reports of progress, make possible greater individualization, and help teachers manage students and instruction more effectively.

In these contexts, keyboarding ability can enhance active, purposeful, meaning-centered use of language to think and to communicate creatively. This is not to suggest that students need to learn keyboarding skills to work with software packages that require one or two keystrokes to progress through the program. Students need to learn keyboarding skills to use computers for composing text. To this end, drill and practice of appropriate fingering techniques is an essential step to develop proper use of the keyboard for composition.

B. Differences Between Keyboarding and Typewriting

Keyboarding and typewriting are not the same. There are several fundamental differences between elementary keyboarding instruction and elementary typewriting instruction. The following chart shows some differences:

Keyboarding	Typewriting
1. Familiarization with alphabetic keyboard using correct fingering, posture, and hand position.	1. Higher degree of proficiency with the alphabetic keyboard using correct fingering, posture, and hand position.
2. Emphasis on practice of fast motions fitted together with the pupil's best rate, without forcing.	2. Emphasis on forcing speed with accuracy coming later as speed is cut back.
3. Familiarization with simple horizontal centering, simple limited tabulations; friendly letters, stories.	3. Formatting includes sophisticated horizontal and vertical centering; sophisticated tabulations; keying on ruled lines; proofreader symbols; interoffice memos; business letters.
4. Familiarization with numeric row and/or keypad.	4. Developed skill with numeric row or keypad.
5. Emphasis on correct fingering.	5. Developed touch typing skill without watching fingers.
6. Emphasis on input; obtaining and communicating information.	6. Emphasis on output; producing documents (hard copy) in final form.
7. Errors are corrected by backspace and replace.	7. Errors are corrected by use of lift-off mechanism or correction materials.
8. Emphasis on input of initial thoughts.	8. Emphasis on output of final product.

C. Outcomes of Instruction With Keyboarding

Most of the expected outcomes of instruction in a language arts program in which computers are used would not be significantly different from the traditional language arts program. The outcomes should relate directly to enhancing the goals of the language arts program, and should address the use of computers as instructional tools to facilitate the attainment of the goals of the language arts program.

For example, the manual entitled Composition in the English Language Arts Curriculum, K-12 states that writing should be for a particular purpose such as:

- To express one's feelings.
- To narrate a fictional story or an account of a real event.
- To explain factual information.
- To describe factual information.
- To persuade another to change an opinion or to influence the actions of others.

The manual lists the kinds of products students might write to accomplish each purpose and the skills that students will need in order to write each product. For example, in grades K-3 one purpose to engage in the composing process might be to express personal feelings, reactions, values, interests, or attitudes. A product that students might write to express themselves is a poem. The skills students will need to develop to write a poem might be:

- Use of poetic form.
- Use of rhyming words.
- Use of rhythm pattern.
- Use of figurative language (e.g., comparison).

Some ways students can develop these skills might be through:

- Brainstorming for descriptive words and colorful action words.
- Practicing with poetic form.

The use of word processing programs provides students with a tool for working through the above in prewriting activities, drafting, revising, editing, and publishing. Students can use word processing programs to record the words they generate for their poems, to experiment with possible forms for their poems, for drafting, revising, editing and publishing their work.

The way in which students learn to use word processing programs hinges on instruction in the electronic keyboard so that its use doesn't impede the creative process that is taking place. Keyboarding also helps students learn the best methods of inputting and extracting their work.

Keyboarding need not take place as isolated instruction. It has been shown that skill in the use of the keyboard can be accomplished as students work on the skills associated with the products they are developing. As instruction in proper keyboarding skill is integrated into the language arts program, students should be able to:

1. Develop facility with electronic keyboards.

    - By using "touch operation" of the alphabetic keyboard.
    - By using proper fingering on the numeric keys.

2. Develop accurate keyboarding skills.

   - By using correct fingering and striking the appropriate key(s).
   - By achieving accuracy as a natural outgrowth of drill and practice exercises, in areas such as: punctuation, spelling, vocabulary, noun-verb combinations, hyphenations, and phrases.

3. Develop acquired skill to key rhythmically through use of drill and practice activities, such as spelling and vocabulary exercises.

4. Develop correct form for efficient keyboard operation.

   - By keeping the body reasonably erect and not leaning over the keyboard.
   - By keeping the fingers well curved and with the fingertips lightly touching the home keys.
   - By keeping the wrists low and relaxed with little or no evidence of tension in the back of the hands.

5. Develop an awareness of the concept that errors in the beginning stages of keyboarding are natural and acceptable.

As keyboarding skills are applied to the composing process, there will be a natural flow for introducing students to the basic format of whole sentences, paragraphing; setting margins; title placement; the possibility of arranging material in columns, rearranging words in sentences, and locating and using pieces of text from other works to build on initial ideas and other themes. Some students with handicapping conditions may be unable to access the keyboard in the standard manner, and will require modified instructional approaches.

D. General Guidelines for Achieving Outcomes

The following general guidelines are important to consider in achieving the five major outcomes above:

- Keyboarding instruction shall be integrated into the elementary language arts program as an enabling skill for manipulating data and ideas, thereby allowing students to discover, record, arrange, and communicate information in a way never before possible.

- Students shall be provided instruction in basic keyboarding techniques at the grade level in which they are first expected to use electronic keyboards in learning situations requiring efficient input, retrieval, and manipulation of words, symbols, and data.

- While most students with handicapping conditions can learn fundamental keyboarding techniques through the standard instructional approaches described in this manual with only minimal modifications, equivalent instruction in keyboarding must be readily available for students with handicapping conditions, who require alternative instructional approaches. Suggested resources can be found in the list of suggested readings (Appendix B).

- Because of the large number of symbols and command functions available on electronic keyboards, instruction should focus on correct fingering techniques from home row locations.

- Sequential and cumulative introduction of new keys with opportunities for practice and application are essential for students to learn effective keyboarding fundamentals.

- Brief, "frequent," regularly scheduled instruction is more beneficial than random, sporadic and lengthy practice sessions.

- Keyboards (electric or electronic typewriters and/or computers) should be readily available for students to use independently for practice and application of new skills they learn during instructional time.

- Furniture and equipment should be adjustable to accommodate a range of pupil sizes and disabilities so that students may comfortably attain proper body position and posture for effective operation of keyboards.

- Instructional materials such as texts, charts, and software should be appropriate for the developmental level of pupils for whom they are intended and for the objectives of the program. These materials should portray a multicultural and sex equity content.

- In order for pupil learning to be most effective, it is important that elementary classroom teachers have adequate training in the instructional goals, objectives, and methodology of keyboarding instruction.

- Teachers responsible for providing keyboarding instruction should be familiar with the strengths, limitations, and adaptability of instructional support materials and their appropriate use in elementary keyboarding instruction.

- Business education teachers should be called upon to assist in the development of keyboarding curricula, in-service training, and selection of materials and methodology.

II. PLANNING FOR KEYBOARDING INSTRUCTION

A. Planning Considerations

School staff should organize a planning committee to consider various ideas and address specific concerns. This committee should include broad representation of administrators, teachers and community members whose expertise will ensure cultural diversity and gender balance.

Planning requires that specific objectives be set, that they be prioritized, examined in relation to their probability of success, cost, and efficiency. Tasks to be accomplished, timeline responsibilities (the what, when and by whom) must be set. The plan must be practical, doable, and have realistic timelines.

Various planning procedures are used by schools, businesses, and organizations. Two useful planning guides are published by the State Education Department. They are

Curriculum Development - A Handbook for School Districts and Getting Started - Planning and Implementing Computer Instruction in Schools.

The implementation of any new program requires the development of both initial and ongoing staff training programs. Integrating keyboarding in the Elementary Language Arts program would include a plan for staff training. The elementary and special education teachers at the grade level(s) where the program is to begin need information about the appropriate uses of technology. They are the essential actors who implement goals, objectives, and instructional activities for a language arts program that integrates the technology. Training should address the methods and techniques for teaching students proper keyboarding skills as they use computers, and the advantages the technology offers.

B. What Research Says About Students and Keyboarding

Researchers in the field of elementary school keyboarding instruction have found the following:

1. A child can learn to key by touch if his/her maturity level is at least that of an average third grader. The level of an individual's concentration appears to be the only limiting factor.

2. Boys and girls do equally well in keyboarding.

3. The physical size of the child is not a major contributing factor. Children with small hands do well. Children who are too short for standard keyboarding desks may, if necessary, sit on a book to raise themselves to a more desirable height.

4. A short (approximately 30-minutes) instructional period works well. By the end of the half hour, the students' concentration will begin to lag, and the effectiveness of the instruction is diminished.

5. Students of elementary school age need the repetitiveness of class instruction to properly learn the skill.

6. Most students with handicapping conditions can learn to key by touch using the standard instructional approaches described in this manual. Some students with physical disabilities, however, may require modified approaches and adaptive equipment.

C. Planning for Teacher Awareness and Training

A necessary element to integrating keyboarding instruction into the curriculum is the awareness and training of school staff. A long-range plan for staff development should be adopted so that all staff members understand how the program will be implemented. Awareness sessions should be part of this plan so that all staff develop an understanding of the goals and the direction of the program. The plan should address the specific training that certain staff will need to implement the program in their classrooms during the first year and in subsequent years. A resource available to many school districts throughout the State is the business education teacher. He or she can be very helpful in developing the plan and for training other teachers in appropriate keyboarding techniques. Business education teachers can also serve as a resource once a program is in place to conduct follow-up activities as needed.

Faculty meetings, in-service courses, and/or release-time opportunities should be an integral part of the staff development plan and should be scheduled for staff. A good in-service course in the development of key-boarding skills should address the following topics:

- Principles of keyboarding instruction.
- How to deal with elementary age students.
- Motivation of the elementary age student.
- Course content of the keyboarding instruction.
- Integrating keyboarding instruction in the curriculum.
- Operation of typewriters and/or computers.
- Teaching/learning strategies and activities.
- Lesson planning.
- Selection of materials that support multicultural understanding.
- The instructional environment.
- Reinforcement of keyboarding skills through practical applications.
- Monitoring student progress.
- Practice for those who are not yet proficient.
- Modifying equipment and instruction for students with handicapping conditions.

D. Delivery of Instruction - Items to Consider

Students should be taught to use the touch system, correct fingering and keyboard operation, posture, and eye contact in keyboarding instruction. Teachers who have been trained in keyboarding methodology are of considerable importance in achieving these goals.

All those involved with the use of writing and word processing with computers need to be involved in learning about keyboarding instruction. It is important to define the school district's K-6 keyboarding and language arts program and course content using this document, the language arts syllabus, as well as the supportive manuals in composition, listening and speaking, and reading and literature.

In cases where students are taught in a computer laboratory, the services of a paraprofessional is helpful for setting up the equipment for a word processing program prior to instruction time, in helping the professional during the instruction time with individual students and in printing out draft or final copy of student work.

If the school district has a computer coordinator, this person can be helpful for facilitating the scheduling of computer time for handling repairs of computer equipment, and for offering suggestions of new programs or other computer "ideas." Considerable assistance can also be provided by high school students knowledgeable in keyboarding and language arts by helping in the elementary school.

E. Reviewing Instructional Equipment and Materials

Students learn best when they are provided with proper equipment, well-designed, properly sequenced learning materials, and a knowledgeable and well-trained teacher. Suggestions for equipment and learning materials are briefly described in the paragraphs that follow for those charged with organizing and providing keyboarding instruction for elementary students.

Equipment. Tables or desks and chairs should be of the correct heights or be adjustable to accommodate the physical differences among pupils. Copy readability

considerations demand the type size be appropriate for various age differences and handicapping conditions. Where possible, books should be at eye level. Color of back-ground and color of type displayed are other factors that affect reading ease.

Keyboarding can be taught successfully in a variety of configurations:

- At typewriters (in a tutorial or group setting) with the teacher directing the activities;
- At computers using tutorial diskettes;
- At computers using a word processing program with the teacher directing activities; and,
- Through some combination of the above configurations.

Ideally computers should be used for keyboarding instruction. However, if access to enough microcomputers is not possible, then as an alternative, electronic typewriters may be used. Manual typewriters are unacceptable for instruction in elementary school keyboarding. Furthermore, each child receiving direct initial instruction should have his/her own keyboard.

It is critical to recognize that hands-on instruction on an electronic keyboard cannot be duplicated by the use of a paper keyboard. The arrangement of typewriter or computer keyboards should also be the same as those in common use. Where microcomputers are used for instruction, it is also essential that printers be available so that hard copy can eventually be produced.

Equipment decisions should be based on the availability of educationally sound software.

School district personnel who are responsible for purchasing electronic keyboard machines should be aware that "convertible" equipment which allows students to use more than one arrangement of keys is becoming available. The QWERTY keyboard is the most common keyboard in use. Keyboarding instruction should be based on the keyboard arrangement which students are likely to use in subsequent years. While other keyboards are available, care should be taken to ensure that the keyboard selected for instruction have long-lasting use. Students with handicapping conditions may require adoptive peripherals or specialized keyboards.

Materials. Three major types of materials are available for teaching keyboarding: (1) textbooks, (2) word processing software, and (3) software instructional packages. The major concerns in selecting materials for keyboarding instruction should be the extent to which they can be used to help pupils achieve keyboarding competencies and the extent to which they meet the individual needs of the pupils being taught in the English language arts program.

In selecting a textbook, features to consider include sequence of instruction, adherence to principles of keyboarding skill development, and the instructional objectives that can be met with the text. The text selected should be one that is appropriate for the maturity and achievement level of the pupils and one that helps them achieve as many of the predetermined instructional objectives as possible while maintaining a balance between the outcomes for keyboarding and the outcomes for English language arts.

Word processing and software packages selected will be dependent on the microcomputer equipment being used, the way the software operates, and the cost of the

software. Word processing software features to consider are the text-editing functions, screen formatting procedures, and print formatting procedures commensurate with ability levels of pupils involved.

Software instructional packages should be evaluated carefully to ensure that the one selected adheres to an educationally sound method of instruction. Many of the "game" programs are appropriate only for drill, remediation, or enrichment. A keyboarding instructional package should support initial instruction rather than replace an instructor. Games can be enjoyable and a helpful part of keyboard skill building; but because many games focus on speed rather than on technique, they tend to virtually force "hunt-and-peck" methods of operation.

Software evaluation in general should support the English language arts program while building keyboarding skills. Deciding whether a specific software package is suitable for specific classroom applications requires a knowledge of curriculum standards and guidelines and knowledge of proper keyboarding skills. In addition to the general evaluation criteria listed in the Center for Learning Technologies publication, Guide to Software Selection Resources, criteria specific to the English language arts can be gleaned from descriptions of program goals. Using the National Council of Teachers of English document "Essentials of English" as a guide, the following criteria emerge:

- o Does software used for writing instruction:
  - reflect an understanding of writing as a process of communication, as well as a way to discover and activate ideas?
  - help students generate ideas for writing, select and arrange those ideas, find appropriate modes for expressing them, or evaluate and revise the written product?
  - help students recognize that precision in punctuation, capitalization, spelling and other manuscript conventions is a part of the total effectiveness of writing?

F. Suggested Criteria for Evaluating Keyboarding Materials

Materials for teaching/learning keyboarding at the elementary level, whether they be in print or in software form, should possess certain features.

1. Materials should be structured so that keyboarding can be integrated with language arts instruction.
2. Materials should emphasize fast motions fitted together for the pupil's best rate, without forcing.
3. Materials should be written in accordance with the maturity and achievement levels of pupils.
4. Keyboarding techniques should be well illustrated and emphasized frequently.
5. The copy to be keyed should progress quickly from isolated letter practice to letter combinations, words, phrases, and sentences.

6. The pace of new learning should be appropriate for the grade level.

7. Frequent review and/or reinforcement lessons should be provided.

8. Goals of initial instruction and practice should be clearly identified.

9. The order of new key presentation should be based on sound criteria.

10. Directions for practice should be clearly marked and easy for pupils to understand.

11. Skill-building lessons should precede and follow the introduction of new keys in order to help maintain techniques and to provide for application of new learning.

12. Provision should be made for frequent assessment of the learner's skill development.

III. IMPLEMENTING KEYBOARDING INSTRUCTION

A. Choosing an Approach

Choosing an approach requires a good review of the software/hardware combinations available and some contact with persons using these approaches in situations where goals, objectives, staffing, philosophy, and other considerations are similar. The following sections outline an approach to teaching keyboarding skills. Some may choose a totally tutorial system, some a combination of word processing programs and direct teacher instruction.

B. Suggested Instructional Sequence for One Lesson

The sequence of instruction which follows is presented here to acquaint the reader with a possible order for presenting an elementary keyboarding lesson.

Introduction (Statement of Learning)

Provide a brief review of the previous lesson.
Identify the letter(s) to be learned in the new lesson.
Demonstrate the location of each new key on the keyboard including the relation of the key to other keys.
Explain the proper finger to use for striking each key and the appropriate motion required in striking the key.

Purpose

Identify words that can be made with the (new) letter(s).
Write the words on the chalkboard and/or give the words to the class orally.

Model Learning

The teacher (or computer program) should demonstrate via equipment and/or chart the correct fingering of the new letter(s) and in combination with letters previously introduced, the forming of new words.

Activity (Guided Practice)

Provide an opportunity for pupils to stroke each newly introduced letter for one line.
Monitor this practice activity and provide reinforcement where necessary.

Oral Restatement of Learning

Reteach fingering, position at the keyboard, and other details, if necessary, after monitoring.

Activity (Guided Practice)

Provide an opportunity for pupils to practice drill material comprised of words using the new letter(s).

Oral Language Activity

Brainstorm with pupils simple sentences that can be made with the words introduced in the previous drill copy.
When possible, develop a short story that incorporates the new words.

Independent Practice

Permit pupils to key letter or word copy as time allows. Monitor pupils for proper fingering and reaches.
Encourage fast motions fitted together at the pupil's best rate without forcing.
Differentiate level of difficulty and pacing.

Formative Evaluation

Evaluation should be based on teacher observation and the checking of keyed work.

C. Ideas for Preparing Lessons

The following ideas will help the teacher to prepare for instruction where electronic keyboards are used:

1. Use keyboard wall charts and individual handouts to facilitate not only locating keys on the computer keyboard but understanding the function of special keys as well.

2. The purpose of each special function key should be demonstrated and discussed; e.g., Return, ESC (Escape), CTRL (Control), CAPS (Capitals), LOCK, and arrow keys.

3. Use a keyboard wall chart, or an overhead projector to display a copy of the keyboard. As the teacher points to the displayed keys and explains their use, pupils should be directed to "find the same key on the keyboard they are using." (See Appendix A).

4. Encourage pupils to use computer software tutorial programs designed to improve keyboarding skills. The programs can best be used as follow-up to direct instruction and can be used independently in the classroom or computer center.

D. Suggestions for Enhancing Instruction

The following suggestions will be found helpful to teachers in providing maximum effectiveness of instructional time:

1. As pupils enter the classroom, if they are using a typewriter, instruct them to insert paper into the machine and type their name and date on top of the page.

   If pupils are using computers (word-processing programs have already been entered into the computers' memory), the pupils should key in name and date.

2. Elicit from pupils what alphabetic letters have already been learned.

3. Provide the opportunity for drill and practice on letters already learned including spacing and capital letters.

4. Take frequent rest periods in the beginning stages of keyboard learning, but utilize these rest periods to develop related language arts skills.

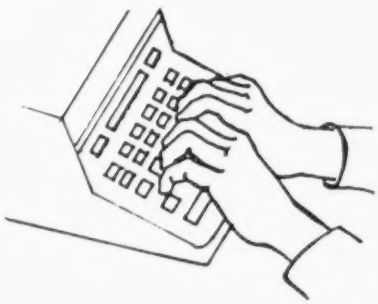
5. Develop with pupils a list of words utilizing new letter(s) introduced as well as letters previously learned.

6. Provide oral drills with students on each new letter and words developed jointly with students.

E. Initial Keyboarding

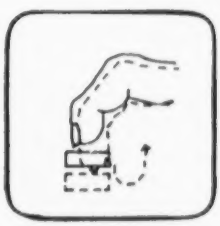
Several techniques are critical in initiating keyboard control. These underlying techniques, with speed of individual motions, should be taught starting with the first day and should be improved and refined daily through recurring emphasis in a cycle of practicing one technique after another. The suggestions used in this section are based upon a large body of research and classroom evidence as described in a major keyboarding methods book.

Keystroking. Fingers should be curved (not straight) so that the fingers will be in an upright (not slanting) position and in a direct vertical line with the keys.



The wrists and arms should be held in a quiet (almost motionless) position. Although there may be a slight vibration in the hands, most of the stroking action should be centered in the fingers. Bobbing wrists are a detriment to the development of keyboarding skill. To maintain correct finger curvature and to get a quick keystroke with the fingertip and a quick getaway from the key, the wrists should be held low but not touching the front frame of the typewriter.

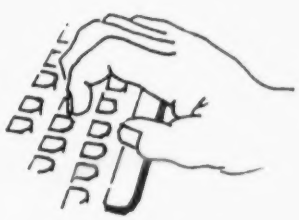
The keys should be struck with a direct, quick snap stroke. Once the reach for a particular key is started, it should be quick and continuous with no hesitation of the finger when striving for keyboarding continuity.



Spacing. Only the right thumb should move. The other fingers should remain curved over their home keys. The tendency of the beginner to straighten the fingers of the hand and let them fly off the home keys as the thumb operates the space bar should be corrected.

The space-bar stroke should come immediately after the last letter of the word is struck. If the beginner needs to make a slight pause, the pause should follow, not precede, the spacing stroke.

The thumb should be kept close to the space bar to avoid excess motion of the thumb making the spacing stroke. Success may result by teaching the pupil to keep the side of the thumb just barely touching the space bar. This reduces the wasteful up-and-down movement that some individuals use in operating the space bar.



When operating the space bar, the thumb should be relaxed and move in a short, loose, oval motion down and toward the palm of the hand. The quick stroke and release of the space bar with a minimum of thumb movement should be stressed.

Shifting. The shift keys should be operated with the little fingers, while other fingers of the controlling hand remain in keying position over their home keys. Correct operation of the shift key is by movement of the little finger from its position over the guide key/home key outward and downward to the shift key. The finger should be well curved so that the center of the key will be struck with the tip of the finger. The shift-key stroke includes a slight hold which must be correctly timed with the keyboard stroke to make the capital letter; then the shift key should be quickly released so that the keying can continue without perceptible pause.

Return. The little finger should move quickly to the return key/enter key, strike it quickly, and return to home-key position instantly while the other fingers remain over their home keys. Because the electric/electronic return is so easy to make, major emphasis should be placed on keeping the eyes on the copy during the return. Avoid a slow-down or pause before the return, and start the new line immediately once the carrier has reached the left margin stop. Frequent attention to the technique is essential until the proper motions are smoothly integrated into the overall keying pattern.

Procedures for Introducing New Keys. Two procedures have been used successfully to teach each new letter key. The first is the "standard" approach; the second, the "anticipatory set" approach. Both have been shown experimentally to be effective.

The following techniques are followed when the standard procedure is used for introducing new keys:

1. Direct students to locate a new key on their keyboard.
2. Have students study a reach-stroke illustration.
3. Demonstrate the reach.
4. Have students place hand in keying position.
5. Have students watch fingers as you dictate words to them.
6. Have them key without looking.

The following techniques are followed when the anticipatory set procedure is used in introducing new keys:

1. Students locate "n" on their keyboard by looking.
2. Teacher asks them to hold up and point to the finger to be used.
3. Teacher demonstrates the keystroking technique to be used.
4. The teacher dictates the letter "n" and directs students to strike the key only as "n" is called.
5. The teacher dictates "n" and students strike the "n" key as they watch the "j" finger make the reach and return to home-key position.
6. The teacher dictates "n" again and the students strike the "n" key as they watch the copy to confirm the accuracy of the response.

7. The teacher directs the students to look up toward the front of the room as he/she dictates "n" once more and students strike "n" without looking either at their fingers or the machine.

8. The teacher has the students check the copy to confirm the accuracy of the response made without looking.

9. The teacher then dictates a tryout line as students follow the copy in the textbook and type each letter, combination, or word on the cue.

F. Procedure for Initial Introduction to Keyboarding

When students are first introduced to keyboarding, the following steps might be helpful to acquaint them with the "position row"/"home row" of the keyboard.

To introduce the keyboard, the teacher might say:

1. Drop your hands at your side. Now lift your hands. Look at your fingers; note how they are curved when your hands are relaxed. This is how you will hold your hands as you strike the keys. (See illustration, page 13, top)

2. Place your hands on the second row of keys. This is called the "position row"/"home row" -- where your fingers will be placed on the keyboard. This is easy to remember for your home is where you go.

3. Look at the keyboard and find the letters A S D F. Place your little finger of the left hand over the "A" key, your ring finger over the "S" key, your middle finger over the "D" key, and your index finger over the "F" key. These are the "home" keys for your left hand.

4. Now, once again, look at the keyboard. Find the letters J K L ; adjacent to one another on the second row from the bottom of the keyboard. Place the index finger of the right hand over the "J" key, your middle finger over the "K" key, your ring finger over the "L" key, and your little (pinkie) finger over the semicolon key.

5. The proper position is with the fingertips lightly touching the home or guide keys. Your hands should be turned in toward each other slightly so the fingers will be in an upright (not slanting) position and in a direct vertical line with the keys.

6. Now both of your hands are on the "position row"/"home row." Strike f f f several times with your left index finger. Strike j j j several times with your right index finger.

7. Don't worry about mistakes in the beginning. We will take care of that problem as we progress.

A word of caution to the teacher might be appropriate at this time. If you are using microcomputers for instruction, you may find it necessary to use a word processing program even with the initial presentation of the alphabetic keys. To save valuable instruction time, it will be helpful to have the computer installation "networked" so that loading the word processing program can be facilitated.

G. Presenting the Numeric Keyboard

Two methods are in common use for keying figures and symbols on the numeric row of typewriters and computers. Depending on the applications, pupils need to know both methods.

1. The Numeric Row Method. This method of fingering is used primarily when large amounts of statistical data are being keyed. Students should be taught to position their hands on the top row of numeric keys. The little finger (pinkie) is positioned on the "1" key, the ring finger on the "2" key, the middle finger on the "3" key, and the index finger on the "4" key; the "4" finger serves to strike the "5" key. (A word of caution: on a computer keyboard, the lower case "L" key cannot be used as a numeral "1.")

The right hand positioning requires that the index finger be placed on the "7" key, middle finger on the "8" key, ring finger on the "9" key, and the little finger (pinkie) on the "0" key. The "7" finger serves to operate the "6" key.

2. Reaching From The Home-Row Method. The home-position/finger-reach method is used only when occasional keying of numerals is required. The fingers of the left hand are placed over the home-position keys a s d f and the reaches to 1 2 3 4 5 are made from this position. The fingers of the right hand are placed over the home-position keys j k l ; and the reaches to 6 7 8 9 0 are made from this position. The "a" finger is used to strike the "1" key, the "s" finger is used to strike the "2" key, the "d" finger is used to strike the "3" key, the "f" finger is used to strike the "4" and "5" keys, the "j" finger is used to strike the "6" and "7" keys, the "k" finger is used to strike the "8" key, the "l" finger is used to strike the "9" key, and the ";" finger is used to strike the "0" key.

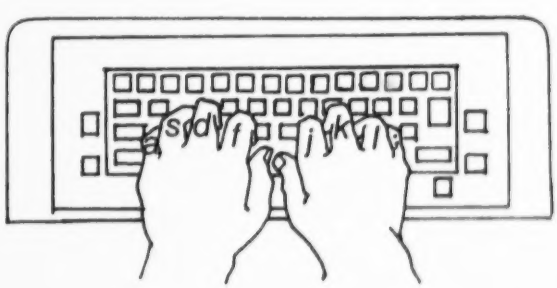
The Keypad. If pupils are using computers with a 10-key pad, students should be taught to position the index finger of the right hand on "4," middle finger on "5," and ring finger on "6." The "4" finger is used to strike both the "7" and "1" keys, the "5" finger is used to strike both the "8" and "2" keys, and the "6" finger is used to strike the "9" and "3" keys. The right thumb or index finger is used to strike the "0" key.

H. Suggested Skill Development Activities

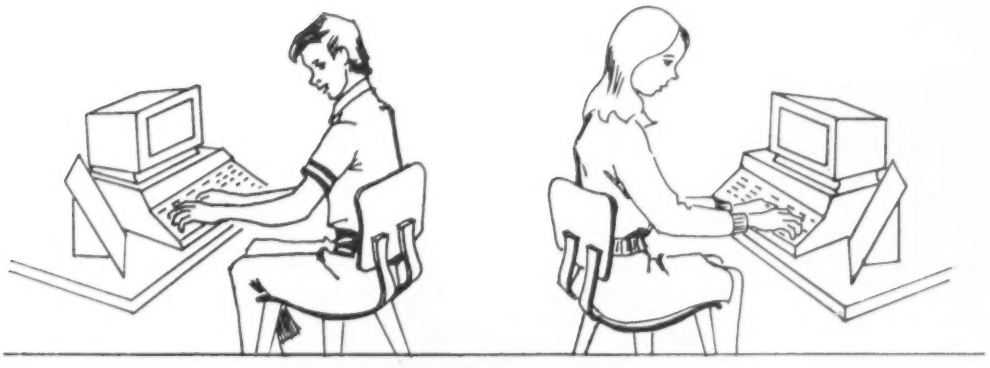
A variety of activities are identified on the pages that follow that teachers have reported to be successful as means for skill development.

Keyboarding Skill-Development Strategies

1. Practice "lift of wrists" and curved fingers on the position row/home row. (Review keystroking position on page 13 and 15.)



2. Have students sit as if their back is against two horizontal broomsticks.



3. Drill keying on the home row. Stress "feel of location" rather than accuracy.

4. Introduce keys to form word families (sad, fad, add, etc.). Have students suggest and key other words having the same word-family base.

5. Have students stroke keys on the home row with their eyes closed.

6. As a class, have students say words aloud as they are keying from copy. Most students can use three senses (sight, hearing, and touch) and will be developing rhythm.

7. Have students suggest words pertaining to a holiday. Then determine the letters students will have to know to key the words. Learn and practice those letters before keying the words.

8. Play the game "Simon Says." Call out directions such as the following: "Simon Says keep your fingers curved, keep your wrists level, use the middle finger on the right hand for the 'k' key." Vary the finger and key with each statement of Simon Says.

9. Have a student or you (the teacher) call out a letter at random as the class keys the letter called.

10. After students have learned a new key, have them practice the new key and words incorporating the letter on their own.

11. Provide practice sheets geared to the developmental stage of students (sheets involving single-letter drills, balanced-hand words, short words, double-letter words, adjacent-letter words, etc.).

12. Have students make holiday or birthday cards using keyboarding graphics from a pattern or individual design. Type the greeting or message on the card along with the design.

13. Have students copy a paragraph keying line for line at a level of proficiency acceptable to the instructor. In order for students to do this, they must be able to:

a. Locate each key in relation to the home key.
b. Use the shift keys properly.
c. Space properly after punctuation marks.
d. Set margins as directed by the teacher.
e. Use the return (or enter) key properly.

14. Have students label a diagram such as the one illustrated on page 19 of the right and left hands. After labeling the diagram, have students indicate for each letter of the alphabet and marks of punctuation which hand and the number of the finger used for stroking the key. This may be done for the symbols and numbers of the top row of the keyboard as well.

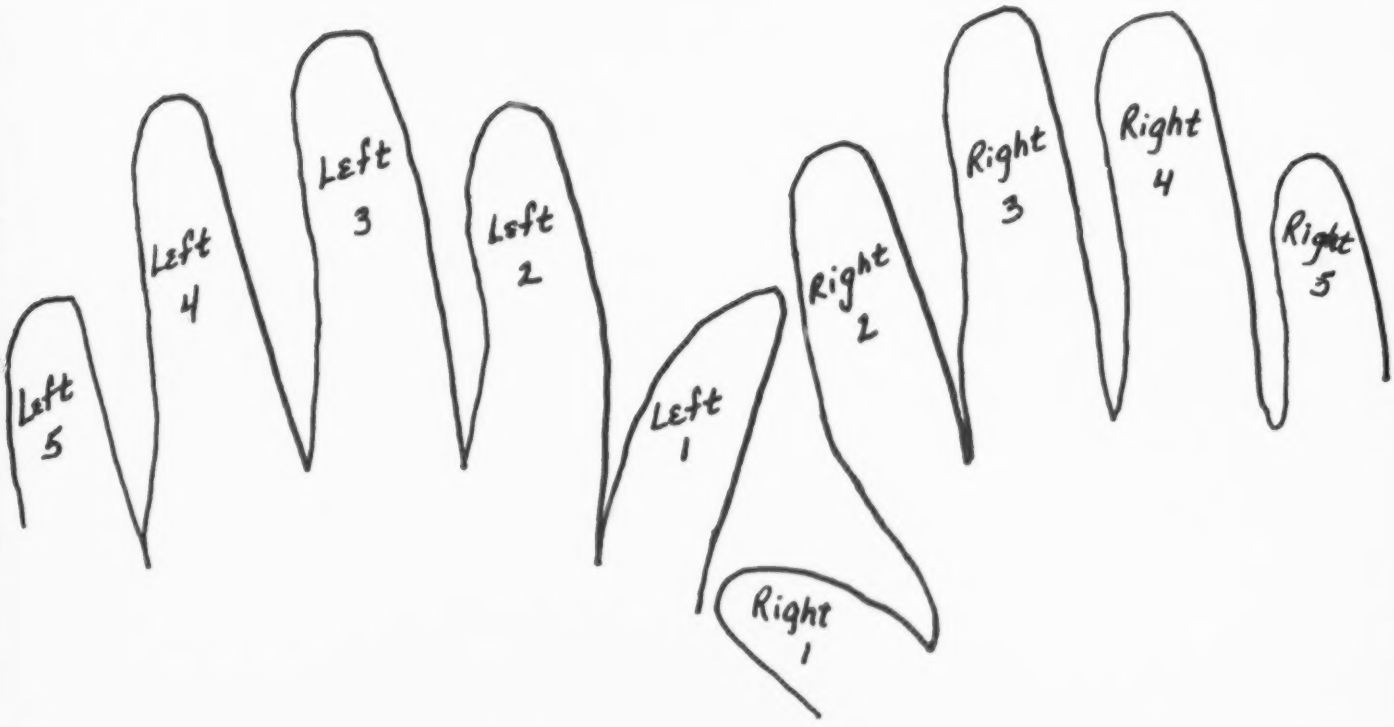
15. The Technique Guide Sheet illustrated on page 20 may be helpful to the teacher for monitoring individual progress of students during the skill-development phase of keyboarding instruction.

In addition to the suggestions listed above, the following may be helpful for students with handicapping conditions:

1. For students who have difficulty locating or maintaining finger placement on the home keys, provide a form of visual or tactile cueing, such as coloring each home key or placing a small raised dot on each home key.

2. Provide a visual model that is close at hand for students who have visual impairments or who have difficulty staying on task.

3. Playing music or using a metronome may be helpful to students in developing a rhythm. This same strategy may be distracting to some students; however, it is imperative to know the individual learning styles of the students.



In the blank space, place the number and left/right of the correct finger used in striking the following keys.

Left 3 Example: d

_____1.	a	_____12.	l	_____23.	w
_____2.	b	_____13.	m	_____24.	x
_____3.	c	_____14.	n	_____25.	y
_____4.	d	_____15.	o	_____26.	z
_____5.	e	_____16.	p	_____27.	- (hyphen)
_____6.	f	_____17.	q	_____28.	/ (diagonal)
_____7.	g	_____18.	r	_____29.	, (comma)
_____8.	h	_____19.	s	_____30.	; (semicolon)
_____9.	i	_____20.	t	_____31.	: (colon)
_____10.	j	_____21.	u	_____32.	. (period)
_____11.	k	_____22.	v	_____33.	? (question mark)

TECHNIQUE GUIDE SHEET

May be reproduced

CORRECT BODY POSITION IS:

1. Feet on the floor, slightly apart.
2. Elbows hanging naturally near the sides of the body.
3. Forearms nearly parallel with the slant of the keyboard.
4. Fingers curved and upright lightly on the home keys.
5. Body is centered in front of the keyboard (center of body directly in front of the "B" key.)

CORRECT KEYSTROKING IS:

1. Curved fingers.
2. Upright fingers (not leaning over onto the little fingers).
3. Quick, snap keystrokes (fingertip snaps toward the palm).
4. Low, relaxed wrists.
5. Hands almost motionless (fingers do the reaching).

CORRECT SPACING TECHNIQUE IS:

1. Use the right thumb (unless the student is a strong, dominant, lefthand user).
2. Strike the space bar with a short, low, down-and-in motion of the thumb.

CORRECT SHIFT-KEY TECHNIQUE IS:

1. Use the appropriate little finger (other fingers, especially the index fingers, stay on home keys).
2. Use a 3-step procedure: (1) shift, (2) strike key, (3) release both.

CORRECT RETURN OPERATION IS:

1. Use the little finger of the right hand (other fingers stay on home row keys).
2. Make a quick reach from home key to RETURN (or ENTER) key and back to home key.
3. Do not pause before or after RETURN motion.
4. Keep eyes on screen (or textbook) copy as the RETURN is made.

Needs Improvement *												

I. Some Language Arts Development Strategies

Approximately 18 to 20 hours of instruction should be devoted to keyboarding instruction within the framework of the Language Arts Program in the elementary grades. Once the keyboard reaches have been established by students, a variety of opportunities are available for the teacher to motivate and enhance Language Arts instruction via keyboarding. Following are a variety of suggested activities.

1. Provide the student with a framed paragraph which required the student to complete the sentence(s) by keying-in appropriate words, phrases, or clauses.

   Example:

   I like Saturdays because _____
   _____
   _____
   _____

   My _____ dog leaps all around the _____ whenever he hears the sound of _____ in the front yard. I wish he would _____.

2. Ask students to key words related to a given topic. Using these words, have them compose a short paragraph.

   Example: Topic - The Fair

popcorn	hot dogs	animals
rides	balloons	clowns

   My family went to the fair last week. I liked the rides and the clowns. I ate my popcorn but I fed my hot dog to the animals. My balloon got away from me. I want to go to the fair again next year.

3. On chalkboard or chart paper, teacher and students compose a short paragraph on class news of the day. Students should then key in a centered title, indent properly, and key in the paragraph. Capable students may develop the paragraph directly on the computer.

4. Review with students keys previously learned, listing them on the chalkboard, e.g., i, l, f, t, and a. Teach a new letter reach, e.g., s. Elicit from students and write on chalkboard words that can be built from these letters. Provide a paragraph from which words have been deleted. Ask students to select and key in words which make a complete and accurate thought.

   Example: On chalkboard: sail fast lift flat, etc.

   On monitor: Father made a _____boat for me. I like to see how _____ it will go.

5. Review known letters, listing them on the chalkboard. Have students discover and key-in pairs of rhyming words.

   Example: On chalkboard: i, f, s, t, l, a, k

   Student keys:

last	still	tail	kit
fast	fill	fail	sit

6. Using the tabular mechanism of the computer/typewriter, have students arrange a series of words in two or more columns or categories. Lists, such as "foods eaten today," may be developed through brainstorming, and sorted into categories such as: f r u i t s, m e a t s, v e g e t a b l e s, etc.

   Other lists can be derived, such as synonyms and antonyms, singulars and plurals or causes and effects.

7. Using word processing software appropriate to the age and abilities of the students, have the students compose on the computer "Thank you" letters to Dracula for coming to a Halloween party, Santa for coming to a Christmas party, or Superman for having taken them on a flight.

8. Using appropriate word processing software, have students key in a different ending to a favorite story, such as the Three Bears, Cinderella, or Black Beauty.

9. Have students take a poem selected by the teacher which has been keyed into the word processing program in prose form and have them rekey it in poetic form.

10. Have each student make a list of the characteristics which would describe himself or herself or a particular character in a story. These could be put in columns such as physical characteristics, behaviors, emotions, etc.

11. Have students develop and keep a computer file in the form of a lined chart to record the materials they read during this year, i.e., books, poetry, newspapers, magazines. They can add new titles to the file as they complete their reading.

Title	Author	Type of Material	Summary

12. Given a sample story, have students use a word processing program to expand the story line, provide more vivid setting, and develop characters. Have students revise and edit the story in preparation for printing a final copy.

13. As a basic prewriting activity, have each student list three or five topics on which he or she is an "expert." For each topic, the student should key in everything that comes to mind related to the topic. A good way to introduce this activity is to set a time limit to promote the free flow of ideas and to avoid judging the merit of each idea as could happen in an untimed activity.

14. This activity is patterned after Musical Chairs. Have each student compose and key-in the beginning of a story. Then, have each student switch computers and add to the development of the story. This activity develops knowledge of and use of story grammar, plot development, transitions, coherence and unity especially in bridging the story to an end.

15. Depending on the students' abilities and access to a microcomputer, students can use a word processing program in using the composing process to develop a book for the class library. The steps might include:

    a) choosing a topic and, in a brainstorming sessions, keying-in ideas related to the topic. (see #12)

    b) entering a first draft with knowledge of the intent to get ideas out and convey meaning, without focusing on mechanics at this stage

    c) moving blocks of text around to organize and reorganize, adding, deleting, and making other revisions

    d) editing for mechanics: punctuation, spelling, capitalization, etc.

    e) formatting a title page

    f) planning the layout; entering commands for page numbers, leaving spaces for illustrations, spacing in general, etc.

    g) printing the pages

    h) creating or inserting graphics or illustrations

    i) binding the book with materials available in the classroom

16. Develop students' prediction skills by reading several pattern books which use repeated language patterns or story events. Ask students to key-in their own stories incorporating one of the patterns. The repeated phrase or sentence can be used to promote the ability of the student to command the computer to manipulate text. This activity may be done as a group story-writing activity with younger students.

17. Have a keyed-in or typed paragraph in which the topic sentence is first and is followed by support sentences. Ask students to try moving the topic sentence to some other place within the paragraph and make changes necessary to maintain the unity and coherence of the "new" paragraph.

J. Activities for Releasing Tension

It will soon become apparent that during the initial stages of keyboarding instruction students are apt to be tense and fearful of making errors. It is important that from the very beginning of instruction students realize that errors are to be expected. It is important that students understand that keyboarding skill is developed as a result of making mistakes. At some later point in instruction, after students have learned the letter reaches and begin to exhibit some degree of proficiency, the use of correction materials and devices should be explained. For students using a microcomputer, an error or delete key will take care of corrections just made and the procedures within the word-processing program will help to take care of errors made previously.

Rest periods are important during the initial instruction periods to provide relief from the tension that is so common. The teacher should explain during the initial sessions various physical activities that provide release from stress.

Examples:

1. Spell out S H A K E (and students will shake their hands).

2. Spell out W I G G L E (and students will wiggle).

3. Spell out S T A N D (and students will stand).

4. During another rest period, spell out various objects that you want students to find in the classroom. (F I N D T H E W O R D J E T S.) Students will look for the word on someone's T- or sweat shirt.

APPENDIX A

Glossary

Computer Games	Computer programs designed for educational and recreational purposes and involving interaction between the player(s) and the computer.
Differentiated Practice	Assuring (after the new-key learning) that what and how various students' practice is geared to their individual needs.
Evaluation	Assessing how each student is approaching preset goals (for technique, speed, and accuracy). Technique can be evaluated only by observation; speed, by timed writing; and accuracy, by checking the work students have produced. Such evaluation should be formative: used only to provide suggestions for better practice methods that will lead to improved performance.
Individual Goal Setting	Setting a goal for each student geared to his/her most recent performance.
Keyboarding	Stroking the keys of a typewriter or computer keyboard by the "touch system."
Keyboarding Hardware	The typewriters or microcomputers used for producing copy, editing copy, producing hard copy, or for providing input to a computer.
Modeling	Demonstrating aspects of a technique to be learned.
Numeric Keypad	The placement of number keys on some keyboards in an arrangement similar to a 10-key calculator.
Pacing	Leading students to progressively higher levels of keystroking by setting a pace for each student just beyond his/her current keystroking level.
Pipe-Organ Method	A method for stroking the number/symbol keys whereby both hands are raised directly to the top row of the keyboard when keying in numbers and/or symbols -- much the same technique as is followed in playing a pipe organ.
Reinforcement	Providing frequent feedback regarding results of practice (confirmation or correction of keyboarding techniques by observing students at work).
Software	Program aids supplied by a manufacturer or which may be purchased to facilitate the efficient operation of the computer hardware or to provide means for additional learning or recreation.
Teacher-Paced Dictation	Keying with the class selected lines in the early lessons, establishing a uniform pace by calling the letters for students, and encouraging their keeping pace with the demonstration machine.
Word Processing	The storage, manipulation, and processing of data needed in the preparation of letters and reports through the use of terminals, microcomputers, and related devices.

APPENDIX B

Suggested Readings

Teachers will find a variety of helpful suggestions for elementary keyboarding instruction in the following references.

Behrman, Carol H. "Developing Basic Language Skills Through Typing: An Experiment at the Fifth-Grade Level." Business Education World, May/June 1978.

Boudrot, Thomas E. "Writing Skills and Word Processing: Eight Easy Steps To Get You Started." Teaching and Computers, Spring 1984.

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Kaser, Kenneth J. "Keyboarding Course for K-6." Business Education Forum, November 1984.

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Kisner, Evelyn. "Keyboarding - A Must for Tomorrow's World." The Computing Teacher, February 1984.

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Robinson, Jerry W. "Learning to Keyboard: Micro-Tutoring and 'Live' Instruction." Century 21 Reporter, Spring 1983.

Schmidt, B. June. "Selecting Materials for Keyboarding Instruction on Microcomputers." Business Education Forum, April 1985.

Stearns, Roberta N. "Keyboarding on Formal Instruction." Punchline, Winter 1985.

"This We Believe About Keyboarding." A statement by the Policies Commission for Business and Economic Education, National Business Education Association, 1984.

The following resources may be helpful to teachers in meeting the individual needs of students:

Browning, Philip, et al. "Computer Technology for the Handicapped Special Education and Rehabilitation: A Resource Guide, Volume I and Volume II." International Council for Computers in Education, University of Oregon. Eugene, Oregon. 1983 and 1985.

Deminguey, Jeronime. "Educational Applications of Electronic Technology." Western States Technical Assistance Resource. USA. 1982.

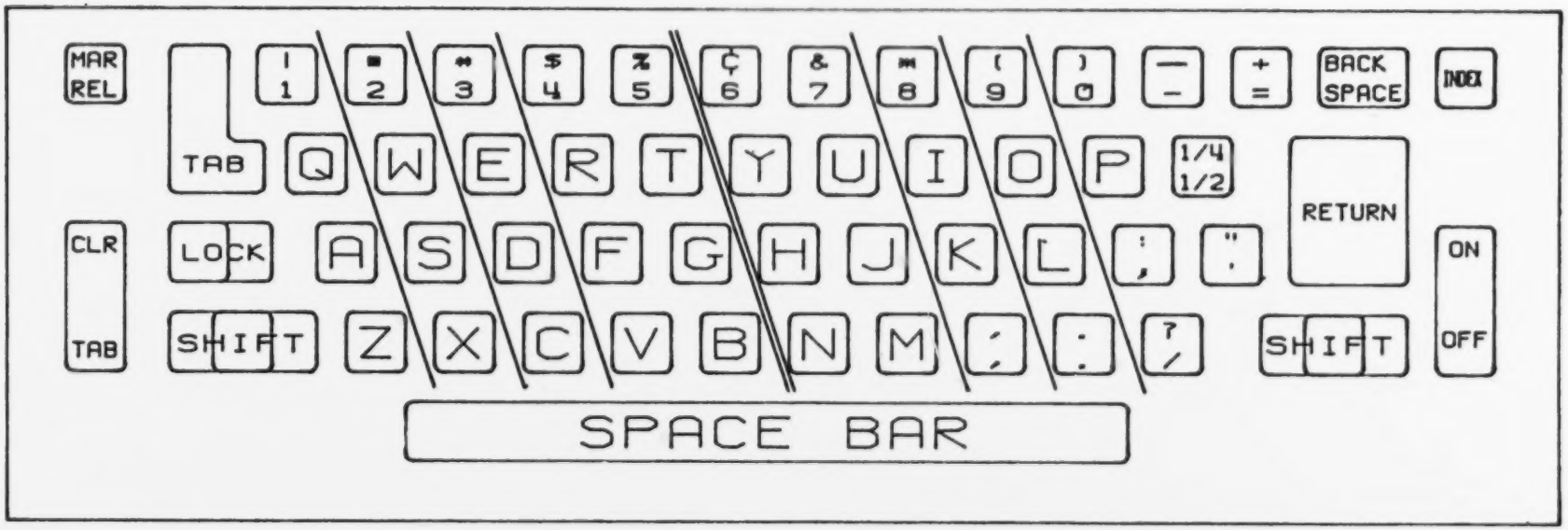
Faber, Florence. "Microcomputers in Special Education." Reston, Virginia. Council for Exceptional Children. 1983.

Goldenberg, E. Paul. "Special Technology for Special Children." University Park Press. Baltimore, 1979.

Metzger, Merrianne. "Learning Disabled Students and Computers: A Teacher's Guidebook." International Council for Computers in Education. Eugene, Oregon. University of Oregon. International Council for Computers in Education.

APPENDIX C

CONVENTIONAL KEYBOARD



Lines indicate controlling home row reaches (e.g., the "J" finger controls the following keys: 6, 7, Y, U, H, N, M).

APPENDIX D

Students with Handicapping Conditions

The Board of Regents, in revising the Part 100 Regulations of the Commissioner, has made a strong commitment to integrating the education of students with handicapping conditions into the total school program. According to Section 100.2(s) "Each student with a handicapping condition, as such term is defined in Section 200.1(ii) of this Chapter, shall have access to the full range of programs and services set forth in the Part to the extent that such programs and services are appropriate to such student's special educational needs." Districts must have policies and procedures in place to make sure that students with handicapping conditions have equal opportunities to access diploma credits, courses and requirements.

The majority of students with disabilities have the potential to master the curricula content requirements for a high school diploma. Most students who require special education attend regular education classes in conjunction with specialized instruction and/or related services. These students must attain the same academic standards as their nonhandicapped peers in order to meet these requirements. For this reason, it is very important that at all grade levels students with handicapping conditions receive instruction in the same content areas so as to receive the same informational base that will be required for proficiency on statewide testing programs and diploma requirements.

It is as important that teachers providing instruction through this syllabus/curriculum be familiar with how the process of special education is implemented. This appendix will provide clarification as to how students with handicapping conditions participate in both regular and special education programs. The coordination and integration of both of these programs is essential for the benefit of all students.

Providing Special Education

A student who is suspected of having a handicapping condition which adversely affects the student's educational performance must be referred to the Committee on the Handicapped (COH) by either the student's parent, a professional staff member of the school, a physician, a judicial officer, the commissioner or designee of a public agency with responsibility for welfare, health or education of children, or the student, on his or her own behalf, if he or she is 18 years of age or an emancipated minor. The referral must be in writing.

The COH then must proceed to conduct an individual evaluation. This evaluation is a comprehensive assessment which is used by the COH to determine whether the student has a handicapping condition which adversely affects the student's educational performance. If the Committee on the Handicapped determines that the student is eligible for special education, the COH and the student's parents develop an individualized education program (IEP). This recommendation must include:

- Present levels of performance and individual needs according to the four criteria areas of academic, social and physical development and management needs,
- classification of the handicapping condition,
- annual goals,
- recommended program, class size, extent of participation in regular education,
- projected date for initiation of special education, amount of time per day and projected review date,

- specialized equipment and adaptive devices,
- testing modifications, and
- recommended placement.

Following the COH recommendation, the Board of Education (BOE) has 30 school days to arrange for implementation. After the student enters the program, a planning conference is held to complete the development of the individualized education program by adding short-term objectives and objective criteria and evaluation procedures for determining whether the instructional objectives are being met. The student's program is reviewed at least annually and the student receives a comprehensive reevaluation at least every three years.

The entire process has corresponding timelines and due process procedures for each step.

As the Committee on the Handicapped makes its recommendation for appropriate programs and placements, careful consideration is given to the concept of the least restrictive environment. The concept of least restrictive environment has three key components:

- Special education needed by the student - This means that the recommended program of a handicapped student must meet his or her individual needs. This ensures that any placement into either special or regular education programs must be appropriate. If a student is recommended for participation in a regular education setting, then the student should have abilities which would allow that student to benefit from such instruction.
- Participation with nonhandicapped peers to the maximum extent appropriate - Consideration of this component ensures the integration of handicapped students with their nonhandicapped peers, whenever appropriate to their individual needs.
- Proximity to the student's place of residence - Consideration of this component maximizes the potential interaction between parents and school, as well as the student's interaction with other students in the home school area.

The concept of least restrictive environment is important for all educators to understand. Its intent is to include handicapped students into the total educational system whenever possible, but it also ensures that such placements must be appropriate. Therefore, any placements that would seem to be inappropriate should constitute a referral to the COH for reconsideration.

The teacher providing instruction through this syllabus/curriculum has the opportunity to provide an educational setting which will enable the students to explore their abilities and interests. Instruction could be provided to handicapped students either by teachers certified in this subject area or by special education teachers. Teachers certified in this subject area would be providing instruction to handicapped students recommended by the COH as being able to benefit from instruction in a regular educational setting. Special education teachers may also provide this instruction to a class of students with handicapping conditions in a special class setting.

Teachers certified in the subject area should become aware of the need of those students with handicapping conditions participating in their classes. Instructional techniques and materials must be modified to the extent appropriate to provide students with handicapping conditions the opportunity to meet diploma requirements. Information or assistance is available through special education teachers, administrators, the Committee on the Handicapped or a student's IEP.

Special education teachers providing this instruction must also become familiar with the goals and objectives of the curriculum. It is important that these teachers provide their students with the same or equivalent information contained in the curriculum.

Regardless of who provides the instruction, the cooperation between teachers of regular and special education programs is essential. It is important for the students as well as the total school environment.

Another consideration in assisting students with handicapping conditions to meet the requirements of regular education is the use of alternative testing techniques. Handicapped students may be provided alternative testing techniques on statewide tests and district testing programs. The consistent use of alternative testing techniques is important for providing handicapped students the opportunity to demonstrate their knowledge and skills without being limited by their handicapping condition.

The coordination and cooperation of the total school program will assist in providing the opportunity for a greater number of handicapped students to meet the requirements needed to pursue a high school diploma. The integrated provision of regular education programs, special education programs, remediation, alternative testing techniques, modified teaching techniques and materials, and access to credit through alternatives will assist in enabling such students to pursue the high school diploma to a greater degree. The teacher who provides instruction through this curriculum has a unique opportunity to assist such students in their individual goals.

Throughout the development of the Action Plan, the Board of Regents reaffirmed a strong commitment to integrating the education of students with handicapping conditions into the total school program. In keeping with the concept of total integration, the following subgoal of the Action Plan was established:

> In all subject areas, revisions in the syllabi will include materials and activities related to generic subgoals such as problem solving, reasoning skills, speaking, capacity to search for information, the use of libraries and increasing student awareness of and information about the disabled.

The purpose of this subgoal is to ensure that appropriate activities and materials are available to increase student and teacher knowledge of disabilities. Frequently students, including those with handicapping conditions, are aware of only the differences between people with and without disabilities. Teachers, whatever the subject or content, have an opportunity to assist students in gaining an awareness of the similarities of all people, including those with disabilities.

Teachers are also encouraged to assess the classroom environment to determine how the environment may contribute to student awareness of persons with disabilities. Are persons with disabilities represented in classroom displays and materials? Do books, games, posters, etc. portray children and adults with disabilities in a positive, nonstereotypical manner?

Also, teachers must be aware of the negative images inherent in some terms and avoid the use of such terms (crippled, afflicted, suffering, victim). The use of terminology which shows what people can do rather than what they can't do, and which portrays persons with disabilities accurately and positively should be reinforced and used consistently.

It is important for students to have an opportunity for contact with people with disabilities within their daily environment. Teachers can assist by using instructional materials that include information about children and adults with disabilities. Teachers may contact the local Special Education Training and Resource Center (SETRC) for ideas and specific resources for materials that portray persons with disabilities in a positive manner.

APPENDIX E

A Sampling Of Software

The software listed below is a sample of software available to teach keyboarding skills to elementary school students. It is not intended to be an all-inclusive list of software for this purpose. Educators are encouraged to review all software that is being considered to ensure that the software meets students needs and the elementary language arts instructional program addressed to those needs:

Alphabet Keyboard, Random House. Letter development exercises - no word. For simple recognition, this program would be helpful for students K-2.

Bank Street Writer, Scholastic, Inc. A program to develop and strengthen writing skills. The documentation is well organized and the program is easy to use. A tutorial which reviews basic rules is included.

Gregg Personal Keyboarding, McGraw-Hill, Inc. This program is designed to help students develop keyboarding skills and reinforce speed and accuracy. Appropriate for grades 4-8.

Homeword, Sierra On-Line, Inc. Word processing program appropriate for students in middle school and high school.

Keyboard Cadet, Mindscape, Inc. This is a program for improving keying skills.

Kids on Keys, Spinnaker Software Corporation. A keyboarding program designed for children 3-9 years of age. This program familiarizes a child with the keys but does not explain correct finger placement. Games are included in the program.

Let's Explore Word Processing, Milton Bradley. A word processing program which uses games to reinforce basic keyboarding and English skills. Appropriate for ages 10 and up.

Magic Slate, Sunburst. A word processing program designed for elementary-secondary students. The support materials for Magic Slate provide lessons that would be helpful in teaching young students about word processing. This system has an elementary version, a middle school version, and an adult version.

Mastertype, Scarborough Systems, Inc. Uses games to help learn and refine keyboarding skills. Uses graphics and feedback. This program consists of many programs which have short segments - under three minutes. Appropriate for elementary students, starting at the second grade level.

Micros Made Easy, SRA Thinkware. A word processing program that provides a brief review of keyboarding, explains what a computer can do and identifies the parts of a computer. The games teach programming basics and the documentation is thorough.

Microtyping, Hayden Software. This package includes a manual and an instructional program which allows students to work at their own pace. Errors are displayed on the screen when an exercise is completed.

Milliken Word Processor, Milliken. A word processing program that provides activities to assist students with their writing skills. The documentation is well organized.

Think Tank, Living Videotext, Inc. This program is an outline processor.

Touch To Type, Curriculum Associates, Inc. This keyboarding program is for elementary students. There are two parts to this program--introducing the parts of the typewriter and preparing for typing lessons.

Typing Tutor II, Microsoft. Designed for students in grades 4 through 12. This keyboarding program can be used for drill to support keyboarding instruction.

Typing Tutor III, Highsmith Co. A program that helps build skills at all levels.

Wonderful World of Paws (The), South-Western Publishing Co. A two-diskette program. These diskettes cover 18 lessons, each of which takes 15-20 minutes to complete. The reading level is appropriate for grades 3 through 6. To reinforce specific keyboarding skills, a game drill is included in each lesson. Color graphics are used to aid learning.